Remarks

Claims 1 and 5 are here amended. Support for amendment to claim 1 is found in claim 1 as originally filed and in ¶[0001] of the specification as published. Support for amendment of claim 5 is found in claim 5 as originally filed and in ¶[0016] of the specification as published.

Upon entry of this amendment, claims 1-5 are pending in the application. No new matter has been added, and no new material presented that would necessitate an additional search on the part of the Examiner.

Applicants note with appreciation that the Office action withdraws rejection of claim 5 under 35 U.S.C. §112, first paragraph.

Claims comply with 35 U.S.C. §103(a)

The Office action on page 2 rejects claims 1-5 under 35 U.S.C. §103(a) in view of ¶[0007] of Applicants' specification as published, page 2 lines 21-27 as originally filed, herein after "¶[0007]", in combination with Cohen et al. (Finite Element Methods for Active Contour Models and Balloons for 2D and 3D images, published November 5, 1991).

The ultimate determination of whether an invention would have been obvious under 35 U.S.C. §103(a) is a legal conclusion based on underlying findings of fact. *In re Kotzab*, 217 F.3d 1365, 1369 (Fed. Cir. 2000).

As a preliminary matter, the Supreme Court in *Graham v. John Deere*, 383 U.S. 1 provided an analytical construct to be used when determining whether claims are obvious under 35 U.S.C. §103(a) in view of the prior art. One aspect of this analytical construct includes characterizing the prior art, as a background for a legal analysis.

¶[0007] of Applicants' specification as published

¶[0007] shows a method that includes steps of deforming a matched-up model manually (e.g. by displacing a node) after automatic segmentation has taken place. The automatic segmentation is then performed a second time with the deformed model. For convenience of the reader, ¶[0007] is shown below in entirety:

> Another known method of the generic kind comprises, after automatic segmentation has taken place, deforming the matched-up model manually, e.g. by displacing a node. The automatic segmentation is then performed for a second time with this deformed model. What is problematic about this method is that the step of the method in which the internal and external

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energies are minimized moves the nodes that have been displaced manually back to their original positions, because it is at these positions that the energy of the deformable model is at a minimum. [emphases added]

Factual analysis demonstrates that ¶[0007] shows manually distorting a model by displacing nodes. Further, ¶[0007] shows automatic segmentation of a model.

Nowhere does ¶[0007] teach or suggest recalculation of the nodes of a model in weighted consideration of the nodes that have been displaced manually to which claim 1 as here amended is directed. In contrast, ¶[0007] merely shows manually displaced nodes moved back to their original positions during a second automatic segmentation.

In fact, the Office action on page 3 admits that "the Prior Art does not teach re-calculation of the nodes of the model (M) in weighted consideration of the nodes that have been displaced manually." [emphasis added]

For these reasons, ¶[0007] alone does not render claim 1 as here amended obvious. Claims 2-5 depend directly or indirectly on claim 1 and incorporate all the subject matter of claim 1 and contain additional subject matter. As claim 1 as here amended is not obvious for the above reasons, therefore these claims also are not obvious in view of ¶[0007] alone.

Applicants now show that Cohen, the other cited reference, does not cure the defects of ¶[0007].

Cohen et al., Finite Element Methods for Active Contour Models and Balloons for 2D and 3D images, published November 5, 1991

Cohen shows a 3D generalization of a balloon model as a 3D deformable surface (Cohen et al., Abstract). The surface is deformed under the action of internal and external forces attracting the surface toward detected edgels by an attraction potential (Ibid., Abstract).

Cohen shows incorporating a "weight force" into his 3D reconstruction modes (Ibid., Section 2.2.2). The weight force allows Cohen to take a simple initial surface placed on the border of the image and have the surface fall under the influence of the "gravity" to catch an object that might be far from the border (Ibid., Section 2.2.2). Cohen shows simulating gravity in applying the weight force by applying the force uniformly on the surface in direction and intensity (Ibid., Section 2.2.2). Further, Cohen shows a 3D image that is isotropic (Ibid., Section 4.4). Cohen states; "Setting $w_{10}=w_{01}$ and $w_{20}=w_{11}=w_{02}$ presupposes that the 3D image is isotropic and thus that all directions have equal weight." (Ibid., Section

4.4 [emphasis added]).

Nowhere does Cohen teach of suggest manually displaced nodes, to which claim 1 as here amended is directed. Nowhere does Cohen teach or suggest recalculation of the nodes of a model in weighted consideration of the nodes that had been displaced manually. In fact, Cohen teaches away from weighted consideration of manually displaced nodes as Cohen shows weighting nodes equally (Ibid., Section 2.2.2).

The Office action on p. 3 cites Cohen Section 4.4 and alleges that this section teaches re-calculation of nodes in weighted consideration of the nodes.

Applicants respectfully disagree. Cohen section 4.4 shows setting coefficients for edge detection and surface smoothing, not allowing user correction of an image. Cohen chooses elasticity and rigidity coefficients such that the internal forces have the same magnitude as the external forces and the resulting solution surface fits the edge points while being smooth and regular (Ibid., Section 4.4).

Nowhere does this section teach or suggest recalculation of the nodes of a model in weighted consideration of the nodes that had been displaced manually, to which claim 1 as here amended is directed.

In contrast to the allegation in the Office action, Cohen clearly states "[s]etting $w_{10}=w_{01}$ and $w_{20}=w_{11}=w_{02}$ presupposes that the 3D image is isotropic and thus that all directions have equal weight." (Ibid., Section 4.4 [emphases added). Isotropic is defined in the Merriam Webster online dictionary as "exhibiting properties (as velocity of light transmission) with the same values when measured along axes in all directions". See Appendix A, which is a print-out of this definition of "isotropic".

Further, Cohen shows that he intends the "weight" he uses to be applied equally to all points like the force of gravity. For example, Cohen et al. section 1.2.2 thus states:

> ...separately we make use of a 'weight' force which simulates gravity...The philosophy of the approach is to introduce an elastic curve (or surface) in the image, and let it evolve from an initial position under the action of both internal forces (smoothness constraints and pressure forces) and external forces (attraction toward local edgels and weight forces).

This factual analysis demonstrates that, in contrast to "weighted consideration of the node", Cohen shows all directions having equal weights.

For these reasons, Cohen fails to cure the defects of ¶[0007].

As Cohen fails to cure the defects of ¶[0007], therefore claim 1 as here amended is not obvious in view of ¶[0007] in combination with Cohen. Claims 2-5 depend directly or indirectly on claim 1 and incorporate all the subject matter of claim 1 as here amended and contain additional subject matter. As claim 1 as here amended is not obvious for the above reasons, therefore these claims also are not obvious in view of ¶[0007] in combination with Cohen.

Legal analysis of references combined

According to a summary of criteria in the *Manual of Patent Examining Procedure*, "[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *Manual of Patent Examining Procedure (M.P.E.P.)* §2142 (8th Ed. Rev.2, May 2, 2004); *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991), [emphasis added].

A recent decision by the U.S. Supreme Court, *KSR International Co. v. Teleflex Inc.* 550 U.S.___ , (2007), discusses criteria for showing a motivation to combine numerous prior art references in a determination that a claimed invention is obvious. The U.S. Supreme Court in *KSR* explained that "[t]here is no necessary inconsistency between the idea underlying the TSM [teaching, success, motivation] test and the *Graham* analysis." *KSR international Co.* 550 U.S.___ at p. 15. In fact, the court explains "… it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the newly claimed invention does." Ibid.

Applicants respectfully traverse the above rejection, and show that the facts of the case and the relevant case law indicate that the invention would not have been obvious to one of ordinary skill in the art at the time the application was filed because the underlying facts show that the criteria for a *prima facie* rejection have not been met.

Failure of the cited prior art to teach or suggest all the claim limitations

To establish a *prima facie* case for obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art. M.P.E.P. §2143.03; *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Claim 1 as here amended is directed *inter alia* to recalculation of the nodes of a model in <u>weighted consideration</u> of the nodes that have been <u>displaced manually</u>.

The Office action on page 3 states in reference to ¶[0007] that "the Prior Art does not teach re-calculation <u>of the nodes of the model (M) in weighted consideration of the nodes that have been displaced manually</u>." [emphasis added]

The above factual analysis demonstrates that Cohen also does not teach or suggest recalculation of the nodes of the model in <u>weighted consideration</u> of the nodes that have been <u>displaced manually</u>. In fact, Cohen shows equal weighting.

Therefore, by the legal criteria discussed above, the underlying facts of the content of the cited prior art and of the present pending claims show that the prior art fails to teach or suggest all the subject matter of the claims of the present invention. Therefore, a *prima facie* case that claim 1 as here amended of the present invention is obvious has not been made.

Claims 2-5 depend directly on claim 1 as here amended and incorporate all of the subject matter of this claim and contain additional subject matter. Therefore these claims also are not obvious in view of ¶[0007] and Cohen, alone or in combination.

<u>Proposed modification changes the principle of operation of Applicants' invention</u>

The Manual of Patent Examining Procedure states "[I]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." *Manual of Patent Examining Procedure*, (Eighth Edition, Rev. 3, August 2005), §2143.01, p. 138).

In *In re Ratti*, 270 F.2d 810 (CCPA 1959), claims were directed to an oil seal having a bore engaging portion with outwardly biased resilient spring fingers inserted in a resilient sealing member. See M.P.E.P. §2143.01. The primary reference relied upon in a rejection based on a combination of references showed an oil seal in which the bore engaging portion was reinforced by a cylindrical sheet metal casing. See M.P.E.P. §2143.01. The prior art device <u>required rigidity</u> for operation, whereas the claimed invention <u>required resiliency</u>. See M.P.E.P. §2143.01. The court reversed the rejection holding that the "suggested

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combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principle under which the [primary reference] construction was designed to operate." See M.P.E.P. §2143.01 citing *In re Ratti* 270 F.2d at 813.

Combining ¶[0007] with Cohen would have required changing the principle of operation in Cohen by requiring Cohen to have weighted individual nodes rather than all nodes equally in a simulation of gravity. The generic method shown in ¶[0007] of distorting the model with manual changes is different from applying uniform force to a surface in a simulation of gravity.

Further, Cohen shows the use of iterative algorithms to perform tasks such as edge detection. Direct user correction of the model would have been a change to Cohen's principle of operation in that instead of an algorithm, direct user intervention would have defined the distortion of the image.

Therefore, there would have been no motivation to combine the method in ¶[0007] with the method in Cohen at the time the present application was filed, as such a combination would have required a complete reconstruction and change in the basic principles of operation of the device in Cohen (See M.P.E.P. §2143.01 citing *In re Ratti*, 270 F.2d 810). Therefore, a *prima facie* case that claim 1 of the present invention is obvious has not been made.

Claims 2-5 that depend directly or indirectly from claim 1 as here amended and incorporate all of the subject matter of claim 1 and contain additional subject matter also are not obvious in light of the cited references.

Applicants respectfully request that the rejections of claims 1-5 under 35 U.S.C. §103(a) be withdrawn.

Claims as amended comply with 35 U.S.C. §101

The Office Action on pages 3-6 rejects claim 5 under 35 U.S.C. § 101.

Claim 5 as here amended is directed to a computer readable medium encoded with a computer program, executed by a computer, for a control unit for controlling a memory unit, an image-reproduction unit, a calculating unit and a positioning unit of an image-processing arrangement, for controlling the image-processing arrangement as claimed in Claim 4 according to the following steps: provision of a three-dimensional deformable model whose

surface is formed by a network of mashes that connect nodes at the surface of the model; positioning of a model at a point in a three-dimensional data set at which the structure to be segmented is situated; manual displacement of nodes; and re-calculation of the nodes of the model (M) in weighted consideration of the nodes that have been displaced manually.

Applicants assert that claim 5 as herein amended complies with 35 U.S.C. § 101.

Applicants respectfully request that rejection of claim 5 under 35 U.S.C. § 101 be withdrawn.

Summary

On the basis of the foregoing amendment and reasons, Applicants respectfully submit that the pending claims are in condition for allowance, which is respectfully requested.

If there are any questions regarding these remarks, the Examiners are invited and encouraged to contact Applicants' representative at the telephone number provided.

Respectfully submitted,

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Date: July 30, 2007

Appendix A

Also Visit   Unabridged Dictionary   Learner's Dictionary   Word Central for Kids   Collegiat

◉ Dictionary   ○ Thesaurus   ○ Spanish/English   ○ Medical

isotropic

One entry found.

isotropic

Main Entry: **iso·tro·pic** ◄))
Pronunciation: \ˌī-sə-ˈtrō-pik, -ˈträ-\
Function: *adjective*
Etymology: International Scientific Vocabulary
Date: 1856

: exhibiting properties (as velocity of light transmission) with the same values when measured along axes in all directions <an *isotropic* crystal>
— **isot·ro·py** ◄)) \ī-ˈsä-trə-pē\ *noun*

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Pronunciation Symbols